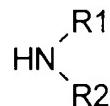


CLAIMS

1. A method of cleaning, disinfecting or inhibiting microbial growth on a hard surface, wherein the surface is contacted with a composition comprising a haloperoxidase, a hydrogen peroxide source, a halide source, and an ammonium source of the formula:



wherein R1 and R2 independently are any of the following radicals: hydrogen, halide, sulphate, phenyl, a straight or branched chain alkyl having from 1 to 14 carbon atoms, or a substituted straight or branched alkyl group having from 1 to 14 carbon atoms where the substituent group is located at C₃-C₁₆ and is any of the following radicals: hydroxy, halogen, formyl, carboxy, and esters and salts hereof, carbamoyl, sulfo, or ester or salt thereof, sulfamoyl, nitro, amino, phenyl, C₁-C₅-alkoxy, carbonyl-C₁-C₅-alkyl, aryl-C₁-C₅-alkyl; which carbamoyl, sulfamoyl, and amino groups are unsubstituted or substituted once or twice with a substituent group R3; and which phenyl is unsubstituted or substituted with one or more substituent groups R3; and which C₁-C₁₄-alkyl, C₁-C₅-alkoxy, carbonyl-C₁-C₅-alkyl, and aryl-C₁-C₅-alkyl groups are saturated or unsaturated, branched or unbranched, and unsubstituted or substituted with one or more substituent groups R3;

wherein R3 is any of the following radicals: halogen, hydroxy, formyl, carboxy and esters and salts hereof, carbamoyl, sulfo or ester or salt thereof, sulfamoyl, nitro, amino, phenyl, aminoalkyl, piperidino, piperazinyl, pyrrolidin-1-yl, C₁-C₅-alkyl, C₁-C₅-alkoxy; which carbamoyl, sulfamoyl, and amino groups are unsubstituted or substituted once or twice with hydroxy, C₁-C₅-alkyl, C₁-C₅-alkoxy; and which phenyl is unsubstituted or substituted with one or more of the following radicals: halogen, hydroxy, amino, formyl, carboxy and esters and salts hereof, carbamoyl, sulfo or ester or salt thereof, and sulfamoyl; and which C₁-C₅-alkyl, and C₁-C₅-alkoxy groups are saturated or

unsaturated, branched or unbranched, and unsubstituted or substituted once or twice with any of the following radicals: halogen, hydroxy, amino, formyl, carboxy or ester or salt thereof, carbamoyl, sulfo or ester or salt thereof, and sulfamoyl;

or R1 and R2 form a group -B-, in which B is any of the following groups: (-CHR₃-N=N-), (-CH=CH-)_n or (-CH=N-)_n in which groups n- is an integer of from 1 to 3.

10 2. The method of claim 1, wherein the haloperoxidase is obtainable from fungi, bacteria, or algae.

15 3. The method of claim 2, wherein the haloperoxidase is obtainable from a fungus selected from the group consisting of Caldariomyces, Alternaria, Curvularia, Drechslera, Ulocladium and Botrytis.

20 4. The method of claim 3, wherein the haloperoxidase is obtainable from Curvularia.

5. The method of claim 4, wherein the haloperoxidase is obtainable from Curvularia verruculosa.

25 6. The method of claim 5, wherein the haloperoxidase is obtainable from Curvularia verruculosa CBS 147.63, or the haloperoxidase is immunologically cross-reactive with the haloperoxidase obtainable from Curvularia verruculosa CBS 147.63.

30 7. The method of claim 2, wherein the haloperoxidase is obtainable from a bacterium selected from the group consisting of Pseudomonas and Streptomyces.

8. The method of claim 1, wherein the haloperoxidase is a Vanadium peroxidase.

9. The method of claim 1, wherein the haloperoxidase is a chloride peroxidase or a bromide peroxidase.

10. The method of claim 1, wherein the source of hydrogen peroxide is hydrogen peroxide, or a hydrogen peroxide precursor, or a hydrogen peroxide generating enzyme system, or a peroxy carboxylic acid or a salt thereof.

11. The method of claim 1, wherein the halide source is a halide salt.

12. The method of claim 11, wherein the halide source is sodium chloride, potassium chloride, sodium bromide, potassium bromide, sodium iodide, or potassium iodide.

13. The method of claim 1, wherein the ammonium source is an ammonium salt.

14. The method of claim 13, wherein the ammonium source is diammonium sulphate, ammonium chloride, ammonium bromide, or ammonium iodide.

15. The method of claim 1, wherein the ammonium source is an aminoalcohol.

16. The method of claim 1, wherein said composition is an aqueous composition.

17. The method of claim 16, wherein the concentration of the haloperoxidase is in the range of from 0.01-100 mg enzyme protein per liter.

18. The method of claim 16, wherein the concentration of the hydrogen peroxide source corresponds to 0.01-1000 mM.

19. The method of claim 16, wherein the concentration of the halide source corresponds to 0.01-1000 mM.
20. The method of claim 16, wherein the concentration of the ammonium source corresponds to 0.01-1000 mM.
21. The method of claim 1, wherein the composition is a granulate.
22. The method of claim 1, wherein the hard surface is a process equipment such as a member of a cooling tower, a water treatment plant, a dairy, a food processing plant, a chemical or pharmaceutical process plant.
23. The method of claim 22, wherein the hard surface is a surface of water sanitation equipment.
24. The method of claim 23, wherein the hard surface is a surface of equipment for paper pulp processing.

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